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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/600,659	06/23/2003	Tetsuzo Ueda	60188-613	6152

7590 04/22/2005  
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EXAMINER
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MAI, ANH D

ART UNIT	PAPER NUMBER
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2814

DATE MAILED: 04/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

88

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/600,659	UEDA ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Anh D. Mai	2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 04 March 2005.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 15-27, 29, 30 and 34-44 is/are pending in the application.
- 4a) Of the above claim(s) 22-25, 30, 40, 41 and 44 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 15-21, 26, 27, 29, 34-39, 42 and 43 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Status of the Claims***

1. Amendment filed March 4, 2005 has been entered. Claims 1-14, 28 and 31-33 have been cancelled. Claims 15, 26, 27 and 29 have been amended. Claims 34-44 have been added. Claims 15-27, 29, 30 and 34-44 are pending. Claims 22-25 and 30 have been withdrawn.

### ***Election/Restrictions***

2. Newly submitted claims 40, 41 and 44 directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: these claims are not belong to the elected species (embodiment #1).

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 40, 41 and 44 have been withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claim 27 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described

Art Unit: 2814

in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

There does not appear to be a written description of the claim limitation “including the steps of: h) bonding a second supporting material in film form having different properties from those of the first supporting material onto the surface of the semiconductor multilayer film opposite to the first supporting material, after step b) is performed and before the step g) is performed; and i) peeling off the second supporting material from the semiconductor multilayer film, after the step g) has been performed” in the application as filed.

As shown in the specification, the second supporting material (21/22) is the package, that is where the LED chip is assembled. Note that, the LED has never been removed from the package (21/22) and has never intended to. (See Fig. 3C-D).

Specification fails to support the amended claim.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 27 and 36 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 27 recites: the method of claim 26, including the steps of: h) bonding a second supporting material in film form having different properties from those of the first supporting material onto the surface of the semiconductor multilayer film opposite to the first supporting

Art Unit: 2814

material, after step b) is performed and **before the step g) is performed**; and i) peeling off the second supporting material from the semiconductor multilayer film, **after the step g) has been performed**.

However, after step b) and before step g), there is only one supporting material (41) is used, after that the LED is placed on a package 22.

What is the second supporting material that the LED be removed from ?

Claim 36 recites: the method of claim 15, wherein the *metal film* includes a metal layer located at the side thereof *opposite* to the semiconductor multilayer film and having a melting point of 300 °C or less.

However, regarding the metal film, claim 15 recites: forming a metal film **over one of** the first and second electrodes....

If the metal film is formed over only one of the electrodes, then there is no opposite to the semiconductor multilayer film.

Since the metal film is formed over one of the electrodes, then the metal film is formed opposite the other electrode.

### ***Claim Rejections - 35 USC § 103***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Art Unit: 2814

5. Claims 15-17, 34-39 and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishizaki et al. (U.S. Pub No. 2004/0051109) of record, in view of Chen et al. (U.S. Patent No. 6,555,405).

With respect to claim 15, Ishizaki teaches method for fabricating a semiconductor light-emitting device substantially as claimed including the steps of:

- a) forming, on a substrate (10) of a single crystal, a semiconductor multilayer film (2/3/4) including at least two semiconductor layers (2/4) having mutually different conductivity types (p-n);
- b) separating the substrate (10) from the semiconductor multilayer film (2/3/4);
- c) forming a first electrode (22) on a surface of the semiconductor multilayer film (2/3/4) and forming a second electrode (23/25) on the opposite surface of the semiconductor multilayer film (2/3/4). (See Figs. 10-13).

Thus, Ishizaki is shown to teach all the features of the claim with the exception of explicitly disclosing the formation of the metal film over one of the first and second electrodes and having a thickness.

Note that, the claimed thickness of 10  $\mu\text{m}$  or more, does not appear to be critical.

However, Chen teaches forming a metal film (70) over one of the first and second electrodes (68), wherein the metal film (70) has a thickness of 20  $\mu\text{m}$  or more, thus, meet the claimed range. (See Fig. 5).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of invention to form a metal film over one of the first and second electrodes of Ishizaki as taught by Chen to enhance the efficiency of light output for the optical semiconductor device.

With respect to claim 16, the semiconductor multilayer film (2/3/4) of Ishizaki is made of a Group III-V compound semiconductor containing nitrogen as a Group V element.

With respect to claim 17, the separation of the substrate (10) and the multilayer film (2/3/4) in step b) of Ishizaki includes: irradiating light having a wavelength at which the light passes through the substrate and is absorbed in part of the semiconductor multilayer film is applied onto the surface of the substrate (10) opposite to the semiconductor multilayer film, so that a decomposition layer is formed inside the semiconductor multilayer film by decomposition of part of the semiconductor multilayer, thereby separating the substrate (10) from the semiconductor multilayer film (2/3/4). (See Fig. 10D).

With respect to claim 34, the metal film (70) of Chen is made of gold, copper or silver.

With respect to claim 35, the metal film (70) of Chen is made by plating.

With respect to claim 36, as best understood by the examiner, the metal film (70) of Chen includes the metal layer (70) located at the side thereof opposite to the semiconductor multilayer film (64) and since the metal layer (70) of Chen comprises the same material as that of the invention, thus, having a same melting point of 300 °C or less.

Art Unit: 2814

With respect to claim 37, as best understood by the examiner, the metal layer (electrode) (25) of Ishizaki contains tin, e.g., ITO.

With respect to claim 38, one of the first and second electrodes (68) of Chen that is in contact with the metal film (70). Since the metal film (70) of Chen comprises the same material as that of the invention, thus, has a reflectance of 90 % or higher with respect to light emitted from the semiconductor multilayer film.

With respect to claim 39, the one of the first and second electrodes of Chen that is in contact with the metal film (70) is formed out of a single layer made of at least one material selected from the group consisting of gold, platinum, copper, silver or a multilayer film including at least two of these materials.

With respect to claim 42, in view of Chen, one of the first and second electrodes of Ishizaki provided on the surface of the semiconductor multilayer film (2/3/4) opposite to the metal film is transparent (ITO).

6. Claim 43 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ishizaki and Chen as applied to claim 15 above, and further in view of AAPA.

Ishizaki and Chen are shown to teach all the features of the claim with the exception of explicitly disclosing the thickness of the transparent electrode.

However, AAPA teaches the transparent electrode (107) is formed on one side of the semiconductor multilayer film and having a thickness (10 nm or less) that meet the claimed range (20 nm or less).



Therefore, it would have been obvious to one having ordinary skill in the art at the time of invention to form the transparent electrode of Ishizaki provided on the surface of the semiconductor multilayer film opposite to the metal film, of Chen, to have a thickness as taught AAPA to provide current to the semiconductor multilayer film and light extracting window for the LED. The transparent electrode of Ishizaki is made of indium tin oxide (ITO) and that of AAPA is a metal containing nickel.

7. Claims 18-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishizaki '109 and Chen as applied to claim 17 above, and further in view of Cheung et al. (U.S. Patent No. 6,071,795) of record.

With respect to claim 18, Ishizaki teaches the step of separating the substrate (10) on the surface of the semiconductor multilayer film (2/3/4) including irradiating light as described in claim 17 above.

Thus, Ishizaki is shown to teach all the features of the claim with the exception of explicitly disclosing the irradiating laser light is pulsing laser light, although it is well known in the art that irradiating laser light is pulsating.

However, Cheung teaches separating a substrate (104) from a semiconductor layer (102) includes irradiating the substrate (104) side with pulsating laser light beam (116). (See Fig. 4).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of invention to irradiating the substrate of Ishizaki utilizing pulse laser light beam as taught by Cheung to facilitate the separation.

Art Unit: 2814

With respect to claim 19, Cheung further teaches that it is not necessary to use a laser as the light source as long as the light intensity is sufficient to form the separation layer. UV light of sufficient intensity may be used in place of pulse laser light. (See col. 6, lines 7-11).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of invention to separate the substrate of Ishizaki by irradiating a light source other than laser having sufficient intensity as taught by Cheung to form the separation layer.

Although not specifically disclosing mercury lamp, however, mercury lamp is well known in the art to emit UV radiation at 365 nm. Thus within the scope of UV as taught by Cheung.

With respect to claim 20, the irradiating light of Cheung is applied such that the substrate is scanned within the surface thereof. (See col. 4, lines 54-65).

With respect to claim 21, the irradiating light of Cheung is applied, while heating the substrate. (See Summary of the Invention).

8. Claims 26, 27 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishizaki '109 in view of Chen '405 and Iwafuchi et al. (U.S. Pub. No. 2002/0115265) of record.

With respect to claim 26, Ishizaki teaches a method for fabricating a semiconductor light-emitting device (LED) substantially as claimed including:

a) forming on a substrate (10) of a single crystals a semiconductor multilayer film (2/3/4) including at least two semiconductor layers (2/4) having mutually different conductivity types (n/p);

b) separating the substrate (10) from the semiconductor multilayer film (2/3/4);

c) forming a first electrode (22) on a surface of the semiconductor multilayer film and forming a second electrode (23) on the opposite surface of the semiconductor multilayer film. (See Figs. 10-13).

Thus, Ishizaki is shown to teach all the features of the claim with the exception of explicitly disclosing the formation of the metal film over one of the first and second electrodes and detailing the separating of the substrate.

However, Chen teaches d) forming a metal film (70) over one of the first and second electrodes (68). (See Fig. 5).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of invention to form a metal film over one of the first and second electrodes of Ishizaki as taught by Chen to enhance the efficiency of light output for the optical semiconductor device.

Further, Iwafuchi teaches the process of separating a substrate from the semiconductor multilayer film (LED) including:

f) bonding a first supporting material (13/14), which is made of a plastic material or a metal, in film form for supporting the semiconductor multilayer film (12) onto the semiconductor multilayer film (12), the first supporting material (13/14) being made of a material different from a material constituting the semiconductor multilayer film, between the steps of a) and b); (see Fig. 1); and

Art Unit: 2814

g) peeling off the first supporting material (13/14) from the semiconductor multilayer film (12), after the step b) has been performed. (See Figs. 1, 5).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of invention to separate the substrate from the semiconductor multilayer film of Ishizaki utilizing the process steps as taught by Iwafuchi to enabling minutely processed devices to be transferred in a short time without inducing an increase in number of steps and without lowering the yield of transfer.

With respect to claim 27, since the limitation of claim 27 comprises new matters and indefinite, a reasonable examining of the claim is impossible.

With respect to claim 29, the plastic material of Iwafuchi is a polymer film, and the polymer film is provided, at a bonding surface thereof, with an adhesive layer that can be peeled off when heated (thermalsetting adhesive, thermalplastic adhesive).

### *Response to Arguments*

9. Applicant's arguments with respect to amended claims have been considered but are moot in view of the new ground(s) of rejection.

### *Conclusion*

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anh D. Mai whose telephone number is (571) 272-1710. The examiner can normally be reached on 9:00AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571) 272-1705. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
April 20, 2008

**ANH D. MAI**  
**PRIMARY EXAMINER**